CLAIMS:

What is claimed is:

1. In a motor vehicle, a control system for controlling at least one part of the vehicle comprising:

a plurality of sensor systems mounted at different locations on the vehicle, each of said sensor systems providing a measurement related to a state of said sensor system or a measurement related to a state of the mounting location; and

a processor coupled to said sensor systems and arranged to diagnose the state of the vehicle based on the measurements of said sensor systems,

said processor being arranged to control the at least one part based at least in part on the diagnosed state of the vehicle.

2. The vehicle of claim 1, wherein at least one of said sensor systems is a sensor selected from a group consisting of a single axis acceleration sensor, a double axis acceleration sensor, a triaxial acceleration sensor and a gyroscope.

3. The vehicle of claim 1, wherein at least one of said sensor systems includes an RFID response unit, further comprising at least one RFID interrogator device, said at least one interrogator device causing said RFID response units of said at least one sensor systems to transmit a signal representative of the measurement of said at least one sensor systems to said processor.

4. The vehicle of claim 1, wherein the state of the vehicle diagnosed by said processor includes angular motion of the vehicle.

5. The vehicle of claim 4, wherein the at least one part is a system selected from a group consisting of a steering system, a braking system or a throttle system, said processor being arranged to control the system in an attempt to maintain stability of the vehicle.

6. The vehicle of claim 5, wherein the at least one part is an occupant restraint device, said processor being arranged to control the occupant restraint device in an attempt to minimize injury to an occupant.

7. The vehicle of claim 1, wherein the state of the vehicle diagnosed by said processor includes a determination of a location of an impact between the vehicle and another object.

8. The vehicle of claim 7, wherein the at least one part is an occupant restraint device, said processor being arranged to forecast the severity of the impact using the force/crush properties of the vehicle at the impact location and control the occupant restraint device based at least in part on the severity of the impact.

9. The vehicle of claim 1, wherein the at least one part is an occupant restraint device.

10. The vehicle of claim 9, further comprising a weight sensing system coupled to a seat in the vehicle for sensing the weight of an occupying item of the seat, said weight sensing system being coupled to said processor and said processor controlling the occupant restraint device based on the state of the vehicle and the weight of the occupying item of the seat sensed by said weight sensing system.

11. The vehicle of claim 1, wherein said processor includes pattern recognition means for diagnosing the state of the vehicle.

12. The vehicle of claim 1, further comprising a display coupled to said processor for displaying an indication of the state of the vehicle as diagnosed by said processor.

13. The vehicle of claim 1, further comprising a warning device coupled to said processor for relaying a warning to an occupant of the vehicle relating to the state of the vehicle as diagnosed by said processor.

14. The vehicle of claim 1, further comprising a transmission device coupled to said processor for transmitting a signal to a remote site relating to the state of the vehicle as diagnosed by said processor.

15. The vehicle of claim 1, wherein the state of the vehicle includes angular acceleration, a plurality of said sensor systems comprising accelerometers such that said processor determines the angular acceleration of the vehicle based on the acceleration measured by said accelerometers.

16. The vehicle of claim 1, wherein at least one of said sensor systems comprises a high dynamic range accelerometer.

17. The vehicle of claim 1, wherein at least one of said sensors comprises a gyroscope including a surface acoustic wave resonator which applies standing waves on a piezoelectric substrate.

18. The vehicle of claim 1, wherein the state of the vehicle diagnosed by said processor includes angular acceleration of the vehicle whereby angular velocity and angular position or orientation are derivable from the angular acceleration, the at least one part being a navigation system, said processor being arranged to control said navigation system based on the angular acceleration of the vehicle.

19. A method for controlling at least one part of the vehicle comprising the steps of:

mounting a plurality of sensor systems at different locations on the vehicle;

measuring a state of the sensor system or a state of the respective mounting location of the sensor system;

diagnosing the state of the vehicle based on the measurements of the state of the sensor systems or the state of the mounting locations of the sensor systems, and

controlling the at least one part based at least in part on the diagnosed state of the vehicle.

20. The method of claim 19, wherein the state of the sensor system is the acceleration, angular acceleration, angular velocity or angular orientation of the sensor system.

21. The method of claim 19, wherein the state of the vehicle is diagnosed by a processor, further comprising the steps of:

providing at least one of the sensor systems with an RFID response unit;

mounting at least one RFID interrogator device on the vehicle; and

transmitting signals via the at least one RFID interrogator device to cause the RFID response units of the at least one sensor system to transmit a signal representative of the measurements of the at least one sensor system to the processor.

22. The method of claim 19, wherein the step of diagnosing the state of the vehicle comprises the step of determining whether the vehicle is stable or is about to rollover or skid.

23. The method of claim 19, wherein the at least one part is a system selected from a group consisting of a steering system, a braking system or a throttle system, the step of controlling the at least one part comprising the step of controlling the system in an attempt to maintain stability of the vehicle.

24. The method of claim 15, wherein the at least one part is an occupant restraint device, the step of controlling the at least one part comprising the steps of controlling the system in an attempt to minimize injury to an occupant in the event of a crash.

25. The method of claim 19, wherein the step of diagnosing the state of the vehicle comprises the step of determining a location of an impact between the vehicle and another object.

26. The method of claim 25, wherein the at least one part is an occupant restraint device, further comprising the step of forecasting the severity of the impact using the force/crush properties of the vehicle at the impact location, the step of controlling the at least one part comprising the step of controlling the occupant restraint device based at least in part on the severity of the impact.

27. The method of claim 19, wherein the at least one part is an occupant restraint device, further comprising the step of sensing the weight of an occupying item of a seat of the vehicle, the step of controlling the at least one part comprising the step of controlling the occupant restraint device based at least in part on the weight of the occupying item of the seat.

28. The method of claim 19, further comprising the step of displaying an indication of the state of the vehicle.

29. The method of claim 19, further comprising the step of relaying a warning to an occupant of the vehicle relating to the state of the vehicle.

30. The method of claim 19, further comprising the step of transmitting a signal to a remote site relating to the state of the vehicle.

31. The method of claim 19, wherein a plurality of the sensor systems comprises accelerometers, the step of diagnosing the state of the vehicle comprises the step of determining angular acceleration of the vehicle based on the acceleration measured by said accelerometers.

32. The method of claim 19, wherein the step of diagnosing the state of the vehicle comprises the step of determining angular acceleration of the vehicle whereby angular velocity and angular position or orientation are derivable from the angular acceleration, the at least one part being a navigation system, the step of controlling the at least one part comprising the controlling the navigation system based on the angular acceleration of the vehicle.

33. In a motor vehicle, a control system for controlling at least one part of the vehicle comprising:

a plurality of sensor systems mounted on the vehicle, each of said sensor systems providing a measurement of a state of said sensor system or a state of the mounting location of said sensor system and generating a signal representative of the measurement; and

a pattern recognition system for receiving the signals from said sensor systems and diagnosing the state of the vehicle based on the measurements of said sensor systems,

said pattern recognition system being arranged to generate a control signal for controlling the at least one part based at least in part on the diagnosed state of the vehicle.

34. The vehicle of claim 33, wherein said pattern recognition system comprises at least one neural network.

35. The vehicle of claim 33, wherein at least one of said sensor systems is a sensor selected from a group consisting of a single axis acceleration sensor, a double axis acceleration sensor, a triaxial acceleration sensor and a gyroscope.

36. The vehicle of claim 33, wherein the state of the vehicle diagnosed by said processor includes angular orientation, velocity or acceleration of the vehicle.

37. The vehicle of claim 33, wherein the at least one part is a system selected from a group consisting of a steering system, a braking system or a throttle system, said processor being arranged to control the system in an attempt to maintain stability of the vehicle.

38. The vehicle of claim 33, wherein the at least one part is an occupant restraint device, said processor being arranged to control the occupant restraint device in an attempt to minimize injury to an occupant.

39. The vehicle of claim 33, wherein the state of the vehicle diagnosed by said pattern recognition system includes a determination of a location on the vehicle of an impact between the vehicle and another object.

40. The vehicle of claim 39, wherein the at least one part is an occupant restraint device, said pattern recognition system being arranged to forecast the severity of the impact using the force/crush properties of the vehicle at the impact location and generate the control signal for controlling the occupant restraint device based at least in part on the severity of the impact.

41. The vehicle of claim 33, wherein the at least one part is an occupant restraint device, further comprising a weight sensing system coupled to a seat in the vehicle for sensing the weight of an occupying item of the seat, said pattern recognition system generating the control signal for controlling the occupant restraint device based on the state of the vehicle and the weight of the occupying item of the seat sensed by said weight sensing system.

42. The vehicle of claim 33, further comprising a warning device for relaying a warning to an occupant of the vehicle relating to the state of the vehicle as diagnosed by said pattern recognition system.

43. The vehicle of claim 33, further comprising a transmission device for transmitting a signal to a remote site relating to the state of the vehicle as diagnosed by said pattern recognition system.

44. The vehicle of claim 33, wherein the state of the vehicle diagnosed by said pattern recognition system includes a state of an abnormally operating component, said pattern recognition system being arranged to identify a potentially malfunctioning component based on the state of the component

measured by said sensor systems and determine whether the identified component is operating abnormally based on the state of the component measured by said sensor systems.

45. The vehicle of claim 33, wherein said pattern recognition system comprises a neural network system and the state of the vehicle diagnosed by said neural network system includes a state of an abnormally operating component, said neural network system including a first neural network arranged to identify a potentially malfunctioning component based on the state of the component measured by said sensor systems and a second neural network for determining whether the identified component is operating abnormally based on the state of the component measured by said sensor systems.

46. The method of claim 33, wherein said pattern recognition system comprises a neural network system and the state of the vehicle diagnosed by said neural network system includes a state of an abnormally operating component, said neural network system including a first neural network arranged to identify a potentially malfunctioning component based on the state of the component measured by said sensor systems and a plurality of additional neural networks, each being trained to determine whether a specific component is operating abnormally, whereby the measurements of the state of the component from said sensor systems are input into that one of the additional neural networks trained on a component which is substantially identical to the identified component.

47. The vehicle of claim 33, wherein said sensor systems are mounted at different locations on the vehicle.

48. A method for controlling at least one part of the vehicle, comprising the steps of:

mounting a plurality of sensor systems on the vehicle;

measuring a state of the sensor system or a state of the respective mounting location of the sensor system;

generating signals representative of the measurements of the sensor systems;

inputting the signals into a pattern recognition system to obtain a diagnosis of the state of the vehicle; and

controlling the at least one part based at least in part on the diagnosis of the state of the vehicle.

49. The method of claim 48, wherein the pattern recognition system comprises at least one neural network.

50. The method of claim 48, wherein the diagnosis of the state of the vehicle includes the angular orientation, angular velocity or angular acceleration of the vehicle.

51. The method of claim 48, wherein the at least one part is a system selected from a group consisting of a steering system, a braking system or a throttle system, the step of controlling the at least one part comprising the step of controlling the system in an attempt to maintain stability of the vehicle.

52. The method of claim 48, wherein the at least one part is an occupant restraint device, the step of controlling the at least one part comprising the steps of controlling the system in an attempt to minimize injury to an occupant in the event of a crash.

53. The method of claim 48, wherein the diagnosis of the state of the vehicle includes a determination of a location on the vehicle of an impact between the vehicle and another object.

54. The method of claim 53, wherein the at least one part is an occupant restraint device, further comprising the step of forecasting the severity of the impact using the force/crush properties of the vehicle at the impact location and generating control signals by the pattern recognition system for controlling the occupant restraint device based at least in part on the severity of the impact.

55. The method of claim 48, wherein the at least one part is an occupant restraint device, further comprising the steps of:

sensing the weight of an occupying item of a seat of the vehicle; and

generating control signals by the pattern recognition system for controlling the occupant restraint device based on the diagnosis of the state of the vehicle and the weight of the occupying item of the seat.

56. The method of claim 48, further comprising the steps of:

identifying by means of the pattern recognition system a potentially malfunctioning component based on the states measured by the sensor systems; and

determining by means of the pattern recognition system whether the identified component is operating abnormally based on the states measured by the sensor systems.

57. The method of claim 56, wherein the pattern recognition system comprises a neural network system, the step of identifying the potentially malfunctioning component comprises the step of inputting the states measured by the sensor systems into a first neural network of the neural network system and the step of determining whether the identified component is operating abnormally comprises the step of inputting the states measured by the sensor systems into a second neural network of the neural network system.

58. The method of claim 56, wherein the pattern recognition system comprises a neural network system, the step of identifying the potentially malfunctioning component comprises the step of inputting the states measured by the sensor systems into a first neural network of the neural network system and the step of determining whether the identified component is operating abnormally comprises the steps of providing a plurality of additional neural networks of the neural network system, each being trained to determine whether a specific component is operating abnormally, and inputting the states measured by the sensor systems into that one of the additional neural networks trained on a component which is substantially identical to the identified component.

59. The method of claim 48, further comprising the step of mounting the sensors at different locations on the vehicle.

60. In a motor vehicle having a seat, a control system for controlling at least one part of the vehicle based on occupancy of the seat, comprising:

a plurality of strain gages mounted in connection with the seat, each of said strain gages measuring strain of a respective mounting location caused by occupancy of the seat, and

a processor coupled to said strain gages and arranged to determine the weight of an occupying item based on the strain measurements from said strain gages over a period of time,

said processor being arranged to control the at least one part based at least in part on the determined weight of the occupying item of the seat.

61. The vehicle of claim 60, wherein said processor is arranged to determine motion of the occupying item of the seat based on the strain measurements from said strain gages over the period of time.

62. The vehicle of claim 60, further comprising at least one accelerometer mounted on the vehicle for measuring acceleration, said processor being arranged to control the at least one part based at least in part on the determined weight of the occupying item of the seat and the acceleration measured by said at least one accelerometer.